

navigable state throughout. The Ohio at Pittsburgh continued low (between 1 foot 0 inches and 2 ft. 6 in.) from the 1st to the 12th, when it rose to 4 ft. 8 in. by the afternoon of the 13th, it then gradually fell to 0 ft. 7 in. on the 23d, (lowest of the month) but rose to 7 feet 6 in. (highest of month) on the 27th; at Cincinnati and Louisville the river continued quite low, and without much change, throughout month. The Cumberland at Nashville, the Tennessee at Chattanooga, and the Monongahela at Morgantown, remained low throughout month, except the flood in latter on the 26th, which is noted under its appropriate heading. The Savannah continued below 4½ ft., except on the 19th and 20th, when it rose to 5 ft. 9 in., and on the 30th, when it rose to 9 ft. 6 in. The observer at Fayetteville, N. C., reported the Cape Fear river lower this season than at any time for the past ten years, the water at one time being so low that steamers could not get within nine miles of the city. The heavy rains during latter part of month caused a rise of about 15 feet. The observer at New Westminster, B. C., reported the Frazier river very high on the 25th, when it was 11 ft. 1 in. above low water.

## TEMPERATURE OF WATER.

The *temperatures of water*, as observed in rivers and harbors, with average depth at which the observations were taken, are given on chart No. II. The observations at San Francisco were interrupted from the 19th to the 31st on account of breakage of thermometer.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms.*—Thunder-storms have occurred in too large numbers during the month to allow of their being enumerated in detail. An examination of the storms, after being charted, shows that the greatest average number prevailed in the Middle Rocky Mountain slope, where from five stations an average of eight storms is reported. The Middle Atlantic and Lower Missouri valley and Lower Lakes average five, while New England, Upper Missouri valley, Upper Lakes and Eastern Gulf range from an average of four to four-and-a-half. Very few of these storms were reported from the Western Gulf, the Plateau districts and the Northwest, and none are reported from the Pacific coast.

*Auroras.*—The most extensive aurora of the month occurred on the 24th, being reported from New England as far south as Westborough, Mass., New York and several points in Dakota. Cloudy weather from Lake Erie to Lake Superior, occurring at that time, prevented observations in those districts. Its appearance and disappearance must have been nearly simultaneous from New England to Dakota, it being noted at 10 p. m. in both sections, and disappeared only at dawn. At Burlington, Vt., it was reported to have an arch of emerald green, with a few very brilliant streamers; its color was noticeably green at both Burlington and East port, and no rose spots seen. Mt. Washington observer, however, reported it as pale yellow, with streamers of deeper hue. At Buffalo its color was faint white. An aurora is reported from Milton, and Wills borough, Penn., on the 25th. On the 16th at Vevay, Ind., maximum brilliancy at 11:45 p. m.; on the 17th at Vevay and New Corydon, Ind., and Mt. Solon, Va.; on the 19th at New Corydon, Ind., at 10 p. m., and at Monticello, Iowa.

*Magnetic Variation.*—Prof. F. Hess reports the variation of the magnetic needle near Pagosa Springs, Col., July 2nd, as 14° 24' east, and on the 18th, near the Blanco river, Col., 14° 32'.

*Atmospheric Electricity Interfering with Telegraphic Communication* at Santa Fe, N. M., from the 7th to the 11th, and from the 18th, excepting the 21st, daily to the 28th inclusive; 10th, violent electrical storm on the summit of Pikes Peak, causing hair to stand out; for a considerable time buzzing noises emitted from all metallic substances; 12th, at Sloop Point, N. C.

## OPTICAL PHENOMENA.

*Solar halos.*—Solar halos are reported in very considerable numbers from New England, the Lower Lakes, Ohio valley, and Upper Mississippi; but three are reported from the South Atlantic States, three in the Gulf States and one in the Northwest. Elsewhere none prevailed or have not been deemed worthy of report. A remarkable solar halo, a report of which was received too late for the June REVIEW, occurred on June 4th, at Port Blakely, Wash. Ter. The sun was surrounded by four distinctly marked rings, the two inner, which were perfectly round, displayed rain-bow colors, the third oval, and the fourth round in form, were white. A huge circle, also of rain-bow hues, passing through the sun's centre, intersected the rings described. A mock sun of blinding brilliancy appeared at the intersection of this outside circle with the lower half of the oval ring. The phenomenon continued for more than an hour.

*Lunar halos.*—These were reported in considerable numbers, especially in the sections south of 38° north and east of 100° west, where, however, only eight solar halos were reported. But two were reported west of the hundredth meridian, one at San Diego, and one at Santa Fé, and but four in the entire Lake region and Northwest.

## MISCELLANEOUS PHENOMENA.

*Polar Bands.*—10th, at Tabor, Ia.; 7th, 11th, 16th, 27th, at Gardner, Me.; Cape Vincent, N. Y., on 24th; Jacksonsburg, O., on the 12th.